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ABSTRACT

North Dakota is one of the first states to create a statewide system--the Interactive Video Network (IVN)--that allows multiple video conferencing between two or more sites. In 1990-91, IVN connected 10 campuses and the State Capitol. IVN's purpose is to deliver quality postsecondary programs to students who would not otherwise have access to these services; improve the quality of offerings on each campus; and expand services with elementary, secondary and vocational education, state agencies, the private sector, and other states. This faculty handbook for using IVN is divided into six chapters: (1) Introduction to the North Dakota Interactive Video Network; (2) Classroom Layout and Equipment; (3) Personnel, Management, and Scheduling for IVN; (4) Adapting a Classroom Presentation Style to Interactive Video; (5) Overcoming the "Distance" in Distance Education and Maintaining an Appropriate Level of Interaction; and (6) Preparing and Presenting Visual Aids. It is noted that expansion of the system to serve state agencies, the public, and elementary and secondary schools is planned. A five-item bibliography and a glossary of terms are included. (ALF)

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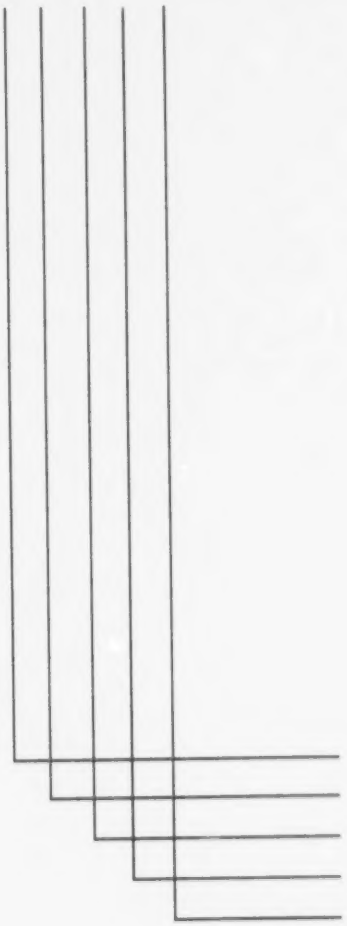
NORTH DAKOTA

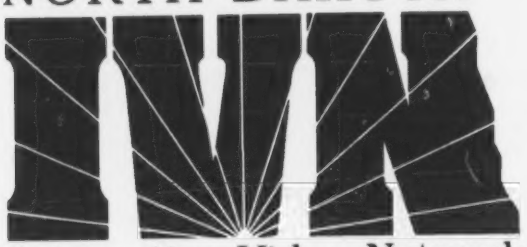
Interactive Video Network



A Practical Guide to Teleconferencing and Distance Education

Joseph R. Tykwinski Russell C. Poulin

NORTH DAKOTA



Interactive Video Network

A Practical Guide to Teleconferencing and Distance Education

IVN logo by Deborah Tanner

Cover design by Lois Stuber

Photographs and illustrations by Joseph Tykwinski

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1991

A special thanks to the IVN Site Coordinators for sharing their insights and experiences relating to several of the topics included in this book.

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Chapter 1

An Introduction To The North Dakota Interactive Video Network

North Dakota is one of the first states to create a statewide system that allows multiple video conferences each connecting two or more sites. The Interactive Video Network (IVN) is the first step in a long-range plan to connect all corners of North Dakota using the latest in communications technology.

The Interactive Video Network allows participants to see and hear people separated by great distance as if they were in the same room. An interactive video conference can connect several sites simultaneously. While participants at one site see only one other site at a time, they are able to hear everyone continuously.

A statewide plan for implementing communications technologies was developed by the Educational Telecommunications Council, which was established by the state legislature and appointed by the Governor. Together with the Information Services Division, the North Dakota University System, and the USDA Rural Health Project, the ETC created a vision for the future.

The Vision

The Educational Telecommunications Council plan calls for a two-pronged attack to build an integrated statewide network. State and local agencies will work simultaneously to construct the network.

The Department of Public Instruction, the Educational Telecommunications Council, and local school districts are working to cluster schools into distance learning cooperatives. These clusters will choose the technology that best meets local needs.

The North Dakota University System and the Information Services Division are developing a statewide backbone inclusive of regional switching hubs for video activities. Together, they will manage the long distance lines required to connect these hubs.

After the development of local clusters, regional hubs, and connectivity standards, the local clusters will be able to connect to the statewide network. All of North Dakota could then be connected through interactive video communications.

Purpose and Funding

The United States Department of Agriculture's Rural Health Project has provided approximately one half of the funding to establish the North Dakota Interactive Video Network. The Project offers Nursing, Social Work, and Medical Technology Degrees to people unable to relocate their families to Grand Forks. Rural hospitals currently experience shortages of qualified personnel. The new pool of health professionals educated by this project will aid these hospitals to fulfill their needs.

State appropriations to the North Dakota University System have funded the balance of the initial cost. The University System encourages the sharing of resources among the state's higher education institutions. Courses seldom taught or previously unavailable on a campus can now be offered through the Network. The University System also promotes more intercampus cooperation without adding inestimable hours behind the steering wheel.

Adopted by the North Dakota Interactive Video Network Executive Committee, the following mission statement addresses the University System's vision in creating IVN:

> The mission of the North Dakota Interactive Video Network is to create and maintain a cooperative among North Dakota's public campuses to use communications technology to:
>
> deliver quality postsecondary programs and services to citizens who would not otherwise have access to these services,
>
> improve the quality of offerings on each campus by sharing knowledge, courses, services, and resources with each other,
>
> expand services to the state through cooperative arrangements with elementary, secondary, and vocational education, state agencies, the private sector, and other states.

Other Uses

The Interactive Video Network is only the first step in creating a statewide network of video centers. While establishing the system, IVN staff worked closely with the Information Services Division (ISD), the state agency which oversees voice and data communications for the state. Expansion of the system to serve state agencies, the public, as well as elementary and secondary schools is among ISD's goals.

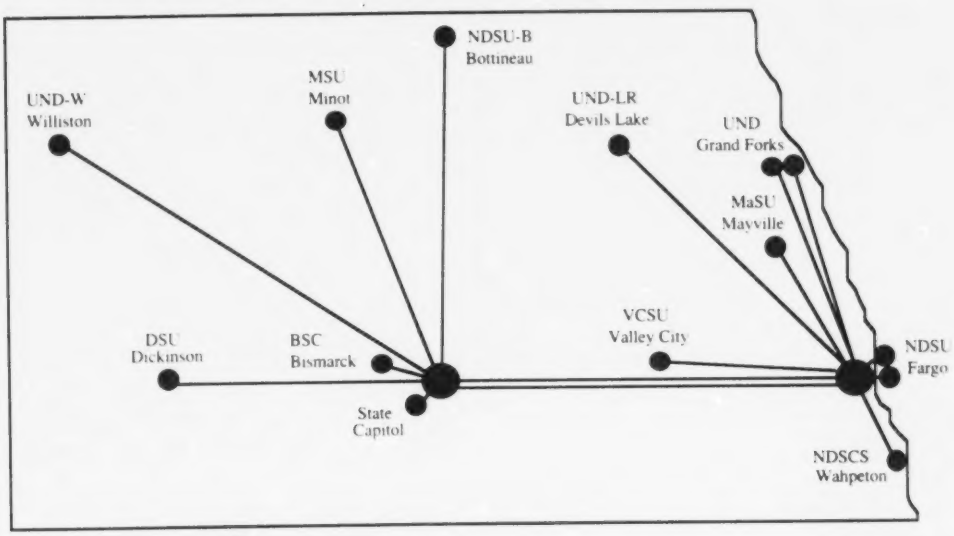
Many additional uses other than higher education courses are possible:

- Meetings
- Workshops and Seminars
- Sharing of Research
- Faculty Development
- Agricultural Extension Activities
- National Guard Training
- Human Services Training
- Judicial Depositions
- Legislative Hearings
- Teacher In-Service
- State Hospital In-Service
- Programs of Community Interest

Implementation

During the 1990-91 academic year, ten campuses and the State Capitol were connected through the North Dakota Interactive Video Network. Eight campuses have one IVN classroom, while NDSU (Fargo) and UND (Grand Forks) each have two classrooms. NDSU-Bottineau will connect to the Network in the fall of 1991.

The North Dakota Interactive Video Network



System Hardware and Configuration

The North Dakota Interactive Video Network is a flexible, two-way interactive communication system. By using cameras and microphones at one site, participants at other sites can watch and listen to an instructor or presenter on a television monitor. Cameras and microphones at the receiving sites allow participants to be seen and heard on television monitors at the other participating sites. Each classroom is also equipped to handle several different types of graphics. The necessary classroom equipment is detailed in Chapter 2.

The following features make the North Dakota Interactive Video Network a highly flexible system:

- Every site can serve as either a sending or receiving site.
- Several different events can be held simultaneously.
- The Network can be easily reconfigured to the combinations of sites required several times each day.

Given the number of sites included in the Interactive Video Network, a maximum of seven different events can occur simultaneously. One limitation is that there are only two lines connecting the video switches located in Bismarck and Fargo. Consequently, a maximum of two events that include sites in BOTH the eastern and western halves of the state may be held at the same time.

The video system uses the "compressed video" transmission format. The video signal from the classroom runs through a special computer that removes unnecessary information from the picture. The resulting compressed signal requires less bandwidth to transmit, and consequently, it is less costly to transmit.

The most notable difference between standard video and compressed video pictures is that fast moving objects will sometimes blur as they move across the television screen. However, at the transmission rate used by the Network, the image approaches broadcast quality.

Chapter 2

Classroom Layout And Equipment

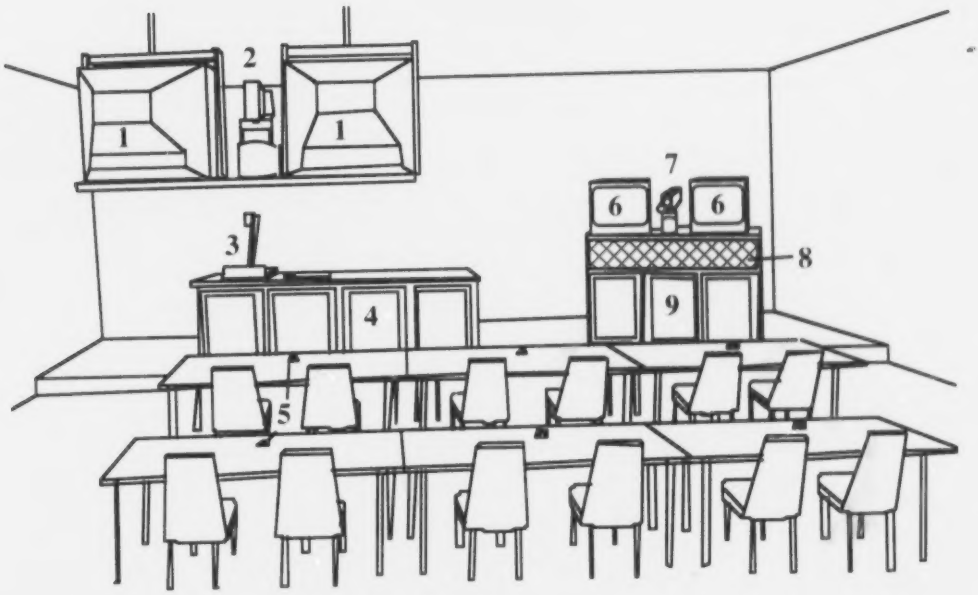
This Chapter provides the basic knowledge of the equipment and configuration of the IVN Classroom prerequisite to understanding several of the presentation techniques that are described in Chapters 4, 5, and 6. Further clarification can be gained by practice with the actual classroom equipment.

The orientation this chapter provides is based on the *typical* IVN Classroom. The specific configuration and equipment at the various sites may differ slightly; however, the major systems and components are the same at all sites. The topics contained in this chapter are as follows:

* **Visual System**
* **Audio System**
* **Telecommunications Equipment**
* **Telephone/Facsimile Machine**
* **The Instructor's Point of View**

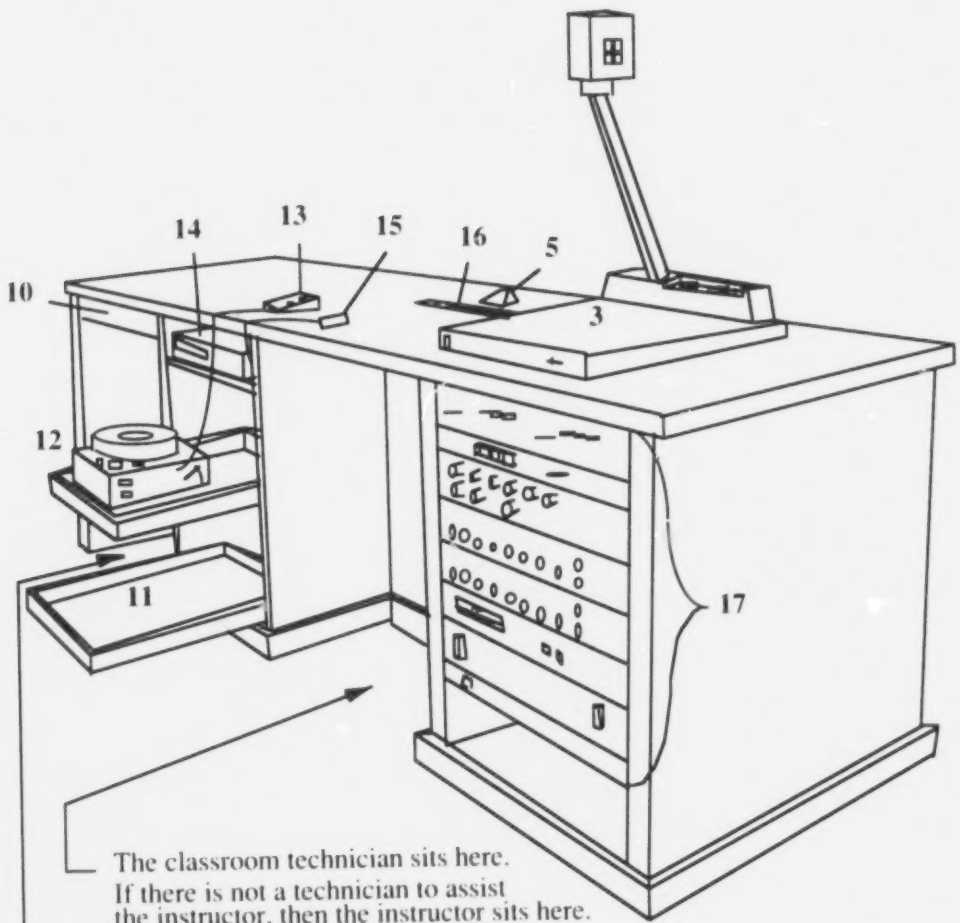
The following illustrations relate to the IVN Classroom. The first illustration presents an overview of the entire classroom. Succeeding illustrations detail the instructor's console and associated rack mounted equipment.

Interactive Video Classroom



1. Instructor's Monitors
2. Instructor's Camera
3. Visual Presenter
4. Instructor's Console
5. Low Profile Microphone(s)
6. Students' Monitors
7. Students' Camera
8. Audio Speaker
9. Monitor and Camera Cabinet
10. Drawer (Remote Control Storage)
11. Auxiliary Equipment Drawer
12. Slide Transfer Unit
13. Slide Transfer Unit Remote Control
14. VHS Player/Recorder
15. Lavalier Microphone
16. Video Switcher (see page 13)
17. Rack Mounted Equipment (see page 10)

Instructor's Console



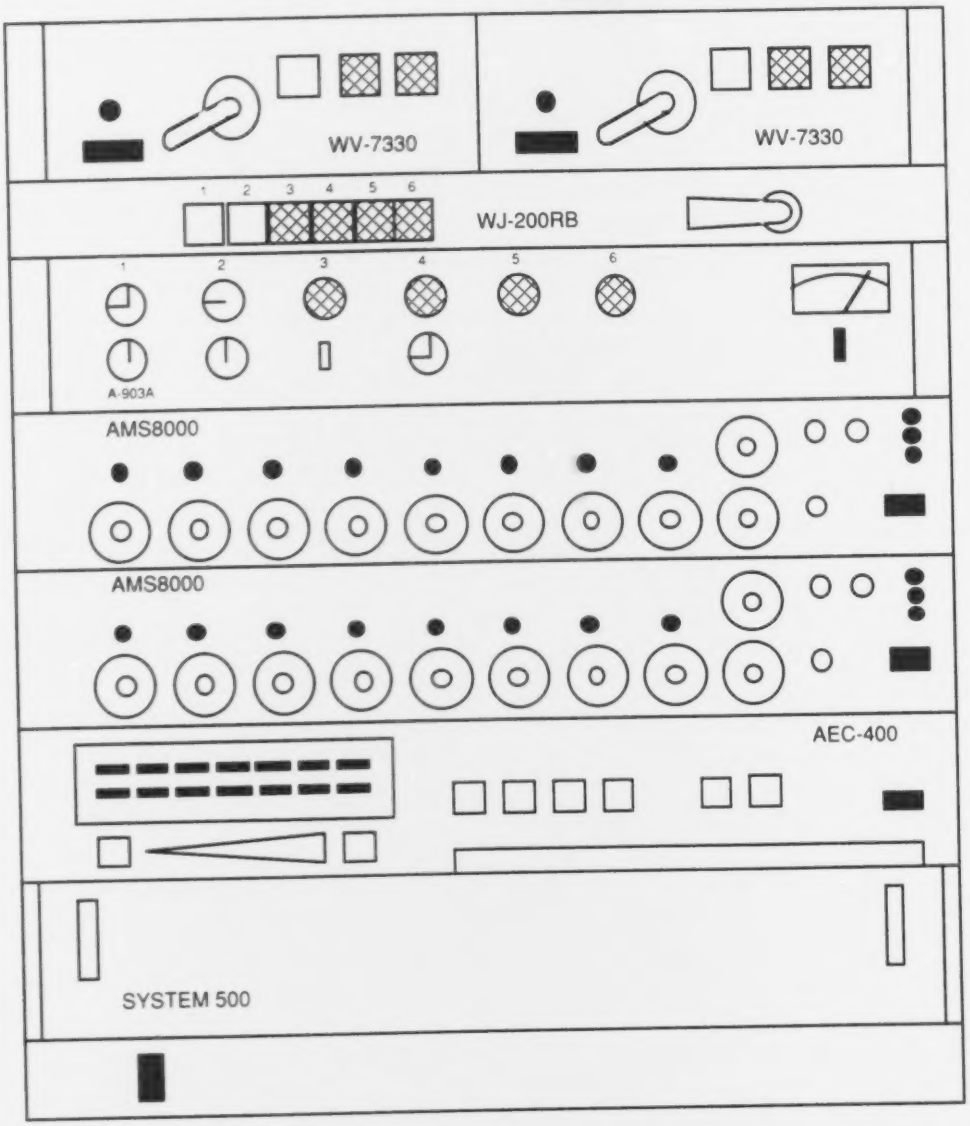
The classroom technician sits here.
If there is not a technician to assist
the instructor, then the instructor sits here.

The instructor sits here if a technician is to assist
with the presentation. The visual presenter unit
can be moved to suit the needs of the instructor.

Rack Mounted Equipment

KEY

Unused Button, Switch, or Dial
LED (Light Emitting Diode)
Power Switch



Explanation of Rack Mounted Equipment

Remote Control Units: The left unit is for the instructor's camera, the right unit is for the students' camera. The joystick controls the pan and tilt. The first small switch controls the camera zoom. At some sites, the second switch controls the camera focus.

Video Switcher: Push the first button to record the local site, or the second button to record the incoming signal.

Audio Switch: Push the toggle switch one direction to record onto a video tape. Push the toggle switch in the opposite direction to play a video tape.

Audio Amplifier: Adjust the input 1 (VHS VCR) and input 2 (receiving sites) dials so that both inputs produce sounds of equal volume. Note that one dial controls all of the other sites. As a consequence, the signal from one site cannot be amplified without affecting the signals of other sites. If the sound reception from one or two sites is poor and the others are clear, then the audio mixers at those sites probably need to be adjusted.

Audio Mixers: There is a separate volume control and corresponding LED for each microphone in the room (Dials 1-8 on each mixer). There is also a control for the VHS VCR (Auxiliary dial on the lower unit). Every site has a default setting that is marked by a dot on each dial. To fine tune these dials: 1) Determine the dial for each microphone by speaking into each microphone and observing the LEDs; 2) Watch the "normal" and "overload" lights on the right end of each unit. If the overload light comes on, the volume is set to high. Also check the LEDs on the Acoustic Echo Canceller; 3) If a site is having trouble hearing only one particular site and the others are acceptable, the mixer at the one trouble site needs to be adjusted. Try using several different microphones in the room. If all of the microphones sound the same, adjust the master dial (this will change the volume of all inputs at once). If the problem is in only a few microphones, adjust the dials for only those microphones.

Acoustic Echo Canceller: The "power" and "conference" lights should be on. This unit can help diagnose audio problems. The top row of LEDs indicates the level of the local classroom sound being sent to the CODEC. The bottom row of LEDs indicates the level of the sound being received from the CODEC (or receiving sites).

Video Distribution Amplifier: This unit divides and amplifies video signals. There are no adjustments on this unit.

Power Strip: This unit must be turned on to supply power to the other units in the rack. The switch should be used to turn the other units on and off.

Visual System

The classroom visual system is divided into three basic categories:

Video Inputs
Video Switcher
Monitors

There are several inputs or video sources that can provide visual information. Each site can televise only one of these inputs at any given time. Someone at each site must choose the input that is televised from that site. The video switcher is used to choose the input. Monitors at both the originating and the receiving sites will display the video image.

Video Inputs

There is a separate button on the video switcher for each video input. A small graphic symbol is attached to each button. The respective symbol used to represent each input is displayed in the left column of this section.

The instructor's camera is suspended from the ceiling along with two monitors. This camera is equipped with a zoom lens and is used to display an image of the instructor during a lecture or as the instructor answers a question. The pan, tilt, and degree of magnification of the zoom lens are remotely controlled from the instructor's console. Some sites also control the camera focus from the instructor's console. Reference the equipment rack diagram on page 10.

The student's camera is mounted on top of a cabinet between two monitors at the front of the room and is focused on the students in the classroom. Sites that are receiving a class primarily use this camera. It is also used to display students at the originating site when they ask or answer a question. Like the instructor's camera, the students' camera can be remotely controlled from the instructor's console. Reference the equipment rack diagram on page 10.

The visual presenter is located on top of the instructor's console. This device is used to display graphics, lecture notes, and small three dimensional objects. The zoom and focus of the camera lens can be adjusted using the buttons located on the head of the visual presenter. To focus the visual presenter, zoom in to a close up of an object and then set the focus. The focus will be set for all magnifications.

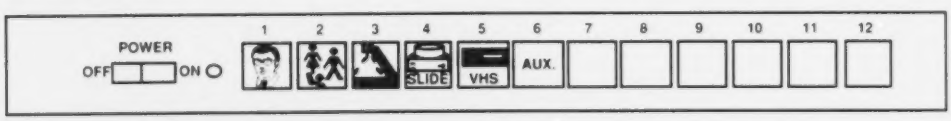
The slide transfer unit is located on a pull out shelf in the instructor's console. The unit displays 35 mm slides much like a regular slide projector, and has an added ability to zoom in or out on the slides. An attached remote control can operate the zoom lens and advance or reverse the slides.

The VHS player/recorder is located on a shelf above the slide transfer unit in the instructor's console. This unit can play or record on to 1/2" VHS videotapes. There is a video switcher and an audio toggle switch located on the equipment rack that must be set before using the VHS player/recorder. When playing a videotape, the audio toggle switch must be in the play position. The video switcher can be in either position. When recording, the video switcher can be set to either record the local site (the signal being sent out) or the distant site (the signal coming in). There is also a wireless remote control for the VHS player/recorder.

The auxiliary button corresponds to any video input that is plugged into the auxiliary video outlet located on the end of the instructor's console. Devices that can be utilized are discussed in Chapter 6.

Auxiliary video inputs can be incorporated into the instructor's console as a permanent arrangement. After this has been done, a separate button on the video switcher is usually designated for that device.

Video Switcher



The video switcher is built into the top of the instructor's console. The purpose of the video switcher is to select and change the televised video input.

There are twelve buttons on the switcher. The first six buttons were illustrated and discussed in the previous section. When one of the buttons is pushed, the other buttons are automatically unselected. At most sites, the button currently selected will be lit. The video switcher is the most often used control in the IVN Classroom.

Monitors

There are four monitors in each IVN classroom. Two of the monitors are located on top of a cabinet at the front of the room. One of these two monitors displays a single receiving site. The other monitor displays the video input selected from the video switcher. This is also the signal transmitted to the other sites. The two monitors at the front of the classroom are viewed by the students and are the "students' monitors". There are also two monitors suspended from the ceiling that display the same images as the students' monitors. These monitors are viewed by the instructor and are the "instructor's monitors" or the "overhead monitors".

All the monitors have wireless remote controls that can turn them on or off. When turning on the monitors, ensure they are set to the "monitor or VCR" mode instead of the television mode. The "input" button on the remote control changes the mode.

Audio System

The components of the audio system are divided into the three basic categories:

Audio Inputs and Mixers
Audio Amplifier and Speaker
Acoustic Echo Canceller

All of the controls for the audio system are mounted in the equipment rack. Reference the illustration and explanation of the rack mounted equipment on pages 10 and 11.

Audio Inputs and Mixers

The audio inputs and mixers allow the receiving sites to hear the originating site and vice versa. These components determine the quality and volume of the signal transmitted from the classroom. This equipment does not affect the sound received from other sites.

Each classroom has several audio inputs. There are approximately fifteen low profile, voice activated microphones intended for student use. The instructor can use either a low profile microphone or a lavalier microphone. The VHS player can originate sound. There is also an auxiliary audio input, located on the end of the instructor's console, for including sound from such devices as compact discs, videodiscs, and cassette tapes.

Each audio input has a corresponding volume control on one of the two audio mixers mounted in the equipment rack. The function of the mixers is to equalize the volume of all audio inputs and to adjust the volume of the signal sent to all other sites. Too much volume will create an audio echo that can be heard at the other sites.

Audio Amplifier and Speaker

The function of audio amplifier is to equalize and amplify the sound coming from other sites and any recorded sound that is played back in the local classroom. The amplifier controls the volume of the speaker in the local classroom.

Adjustments to the audio amplifier should affect only the sound heard in the local classroom. However, if the amplifier is turned up too high, audio feedback will result plus an echo that can be heard at other sites.

Acoustic Echo Canceller

This unit adjusts both the send and receive audio signals to reduce sound echoes. No adjustments should be made to this unit. The LEDs are particularly useful when making adjustments to the audio mixers and when determining the strength of the signals being received from other sites.

Telecommunications Equipment

After the local technician turns on the classroom equipment, there are very few, if any, adjustments that need to be made to the telecommunications equipment during an event. The only piece of telecommunications equipment that can be adjusted from the classroom is the CODEC unit.

The signal sent from the CODEC to other sites can be encrypted. This option limits access of an event to sites that are given the encryption code. <u>This is not a routine option for an event</u>. Arrangements need to be made prior to the event. The encrypting code must be distributed, and technical personnel must enter the encryption code into the CODEC before the event begins.

Choosing the mode of site switching for an event is the only adjustment that should be made to the CODEC by anyone other than campus technical personnel. As previously explained, each site can view only one other site at a time. The method of site switching that is used for an event determines which site is displayed and how the switching from one site to the next is controlled.

The site switching mode is set by the originating site using a wireless remote control. There are three different modes which can be chosen:

Audio Mode
Chair Mode
Lecture Mode

Audio Mode

This mode is also referred to as "voice activated." When the audio mode is selected, the video image of the site with the most predominant audio is displayed at all of the other sites. The video image viewed by all other sites will automatically switch to the site with the most predominant audio.

The audio mode works well for discussions or debates between sites. This mode is also used whenever a technically simplified (automated video switching) mode is desired. When using this mode the receiving sites need to be aware that any noise, such as coughing or tapping pencils, can automatically switch the video image viewed by all other sites to the site originating the noise. Some form of audio must accompany visual material so it can be viewed at receiving sites.

Chair Mode

When using the chair mode, all sites are able to hear each other simultaneously. The single video image viewed by all sites is manually selected by the originating site. The originating site can choose between as many as eight different sites. Once a site is selected, it will be viewed by all sites until the originating site selects a different site.

A presenter using this mode rather than the audio mode has more control of a discussion or debate. However, the switching from site to site must be done manually. If an event requires frequent switching, it will become cumbersome and may require technical support.

Lecture Mode

When using the lecture mode, all sites are able to hear each other simultaneously. The receiving sites will always see the originating site. The originating site can view any one of up to eight different receiving sites. The receiving site that is viewed by the originating site is chosen manually using the wireless remote control. The receiving sites are not aware that they are being viewed by the originating site.

The lecture mode works well when a presenter at the originating site is disseminating information and when receiving sites do not need to see each other. This mode prevents the video image of receiving sites from cutting in on the originating site and does not allow one receiving site to view another receiving site.

Telephone/Facsimile Machine

Each IVN Classroom has a combination telephone and facsimile machine. This device is not connected to the interactive video equipment; it provides an auxiliary means of communicating with other sites. If a problem should arise with the interactive video equipment, the telephone can be used to seek assistance of technical support personnel. The telephone included with the machine operates like a standard telephone.

The facsimile machine itself is a photocopy device that transmits the copy to a distant site via a telephone line. However, print materials should be mailed to receiving sites prior to an event whenever possible. The facsimile machine can be used to supplement mailed materials, especially for information of a spontaneous nature.

There are only a few simple steps to follow when operating the machine. Instructions for using the telephone/facsimile machine are attached to or near the machine. Some of the features of the machine include a one-touch key pad that can be used to dial another site by pushing a single key, as well as broadcast capabilities that allow a document to be sent to multiple locations.

The Instructor's Point of View

The IVN classroom was specially designed to promote eye contact and to provide a user friendly environment that encourages interaction. The instructor's camera is located next to the overhead monitors. As the instructor looks at the receiving sites, the camera has a direct shot of the instructor's face; consequently the students at the receiving sites experience an illusion of direct eye contact with the instructor.

The camera that focuses on the students is located near the front of the classroom, next to the monitor that displays the image of the instructor. When the students look at the instructor on the monitor, they are also looking at the lens of the students' camera; consequently, when the receiving site students are displayed on the instructor's monitor, they appear to be looking at the instructor.

The instructor looking at the students on the overhead or instructor's monitor. The instructor's camera captures and transmits an image of the instructor to the students.

The students at the receiving site looking at the instructor on the monitor. The students' camera, located between the monitors, captures and transmits an image of the students to the instructor.

Chapter 3

Personnel, Management, And Scheduling For IVN

The vitality of the North Dakota Interactive Video Network is dependent on the presenters, instructors, technical support personnel, managers, and policy makers involved. This chapter identifies the role and responsibilities of the people and committees associated with the Interactive Video Network. Included in the last part of the chapter is the procedure for scheduling an IVN Event.

Event Coordinator (Classroom Instructor)

The Event Coordinator is any person wishing to conduct a class, seminar, meeting, or other activity over the Network. The most important person in a successful video activity is the Event Coordinator. That person is the human connection making the technology transparent to the participants. For classes, the instructor assumes this role.

Dependent on the specific activity, the Event Coordinator spends a varying amount of time leading the group. In addition, a successful activity requires behind the scenes preparation in order to bring people and materials together as planned.

For example, an instructor loses some of the freedom normally enjoyed in a class. With students at a distance, the simple task of distributing hand-outs assumes a new complexity. The instructor must plan ahead. Often, diverse resources need to be coordinated to accomplish daily tasks.

Helpful hints for Event Coordinators and classroom instructors:

- **Plan ahead.** Anticipate possible problems before they happen. Give the participants a class syllabus or meeting agenda. Prepare hand-outs early.

- **Pay attention to logistics.** Develop methods to distribute materials to participants at receiving sites. Develop methods for them to send materials to the instructor.

Instructors should perform self assessments by viewing recorded presentations of themselves.

- **Become proficient with the new teaching environment.** Be open to suggestions which may improve teaching effectiveness. Seek further assistance from the Site Coordinator at the local campus.

- **Develop contingency plans.** Technical problems will occur. Create a plan in case these problems occur. Be able to reschedule the meeting or use phone conferencing. Have an alternate lesson plan available at the receiving sites.

- **Make others aware of added responsibilities**. Inform students and other participants about the additional tasks required to conduct an effective event. Inform them of the tips that will make them knowledgeable users of the system.

- **Work closely with the Site Coordinator.** Inform the Site Coordinator of any changes to the event, especially changes in times or number of sites participating. Provide the Site Coordinator with promotional material or other publications describing the event. The Site Coordinator often receives inquiries about events on the Network.

Site Coordinator

The Site Coordinator is the person designated by the campus or site to coordinate on-campus details in classroom scheduling. This person maintains final approval authority for all IVN activities on that campus.

This position provides a key link among the various educational institutions, students, instructors, system scheduling, campus personnel, and users in the community. The Site Coordinator handles the local arrangements for interactive video classes and other events held in the classroom.

Although the Site Coordinators are responsible for a variety of tasks, they may arrange for other people to perform some of these functions. These responsibilities include:

- Serve as contact for scheduling the local classroom.
- Serve as liason between campus personnel and other sites.
- Coordinate with other sites the arrangements required for those sites to receive an event originating from the local site.
- Coordinate with other sites the arrangements required to receive an event originating from another site.
- Serve as liason with the Interactive Video Network Director and the IVN Executive Committee.
- Coordinate IVN efforts with the campus Academic Vice President, Registrar, and Financial Aid Officer.
- Coordinate schedules and assure smooth classroom operation with the Classroom Technical Coordinator.
- Arrange for logistical assistance for classroom participation.
- Provide orientation and training for campus personnel on effective use of the system.
- Serve as a local contact for students and area residents seeking help or information about the Network.

- Provide general information about educational programs available through the Network.
- Promote the use of the Network, within campus and system guidelines.
- Monitor marketing material for events originating from the local site.
- Serve as liaison between the campus and the Rural Health Project.

Classroom Technical Coordinator

The Classroom Technical Coordinator is the person designated by the campus (or site) to coordinate on-campus details in classroom maintenance and operation.

The Classroom Technical Coordinator is a faculty or staff member who serves as the local technical contact for the Interactive Video Network. The Classroom Technical Coordinator is not required to know all of the technical details regarding the operation of the communications and classroom equipment, but must be comfortable with audio and video equipment. Further, the Classroom Technical Coordinator needs to be able to make basic adjustments to the equipment and is responsible for daily operation of the interactive video classroom.

When a problem develops in the video classroom, the Coordinator should localize the problem. Is the problem with a piece of equipment (a camera or microphone) in the room? Are the transmission lines working properly? Is the site experiencing power failures? Do the participants not fully understand how to operate the controls? Is there some new, unanticipated problem?

If the solution is within the Coordinator's expertise, the Coordinator fixes it. If the problem is more difficult, the Coordinator seeks assistance from the appropriate source.

Classroom Technical Coordinators share some of the duties of the Site Coordinator. Among those duties, the Classroom Technical Coordinator needs to help assure that classroom technicians or other personnel are in the classroom at scheduled times so that events occur as planned.

IVN Strategic Advisory Committee

The IVN Strategic Advisory Committee is comprised of one representative from each campus. It is charged with making strategic recommendations on the programming, scheduling, and training needs of the Network.

The Committee has other duties such as making general planning and policy recommendations regarding the direction of IVN. Additionally, the Committee also:

- Serves as an arbiter in scheduling disputes.
- Promotes use of the system in ways that enhance cooperation and educational opportunities across the campuses.
- Develops a general plan for training instructors and other users in the effective use of the Network.
- Recommends incentive plans to encourage faculty and campuses to participate in IVN usage.

IVN Executive Committee

The Executive Committee is charged with managing the North Dakota Interactive Video Network. The Executive Committee duties include:

- Reviewing and approving of the policies for operating and using the Network.
- Overseeing and approving the expenditure of the Network budget.
- Seeking and approving cooperative agreements with other organizations central to the operation and usage of the Network.

IVN Director

The IVN Director is charged with the day-to-day management of the North Dakota Interactive Video Network. The Director coordinates with Network personnel and committees to maintain operations and to seek ways to improve the delivery of IVN events.

Procedure for Scheduling an IVN Event

1. A person intending to hold an interactive video event contacts the Site Coordinator for their campus. That person becomes the Event Coordinator. The site hosting the event then becomes the Originating Site.

2. The Site Coordinator at the Originating Site determines:
   a. if the event is within campus guidelines for IVN classroom use.
   b. if the local IVN classroom is available.
   c. if the necessary resources are available to hold the event.
   d. if the other sites are available by checking the Master System Schedule.

3. If the other sites are free on the schedule, the Site Coordinator requests the event be held by contacting the IVN Scheduling Coordinator and the Site Coordinators at the other sites. The event is tentatively scheduled.

4. Events are confirmed on the schedule according to their level of priority:
   a. Rural Health Project and classes part of an approved academic program may be confirmed 90 or more days in advance of the first day of the event.
   b. All other academic classes may be approved 60-89 days in advance of the first day of the event.
   c. All other events may be confirmed on a first-come, first-served basis less than 60 days in advance of the first day of the event.

   Event Coordinators may ask the Site Coordinator about the process to confirm events early. Receiving sites retain the right to confirm or deny any event.

5. Upon being notified of event confirmation or denial, the Site Coordinator notifies the Event Coordinator and other campus personnel of the schedule. It is the responsibility of each Site Coordinator to ensure that the event occurs as agreed with the other sites.

6. The Site and Event Coordinators keep in touch as necessary until the event is completed to assure a successful event.

Chapter 4

Adapting A Classroom Presentation Style To Interactive Video

The purpose of this chapter is to offer some general suggestions on how to effectively adapt a traditional classroom presentation style to the medium of interactive video. General areas covered are as follows:

* **Personal Performance**
* **Pacing**
* **Movement**
* **Speaking**
* **Eye Contact with the Camera**
* **Clothing**
* **Eye Glasses and Jewelry**
* **Communicating with the Classroom Technician**

There is not a single, "correct" presentation style that should be used when teaching over the Interactive Video Network. The most effective presentation style that can be brought to the Interactive Video Classroom is based on the style with which the instructor is most comfortable and incorporates adaptations that enhance televised instruction.

As the following sections are read, take time to:

- Identify the suggestions and tips already being utilized.
- Generate specific actions that can be taken to implement the concept or suggestions being discussed.

Personal Performance

The first question many instructors ask when they walk into a televised classroom is, "How should I act on camera"? The best answer is "Don't"! Interactive video instruction techniques should be more like traditional classroom instruction rather than a television drama.

Interactive video programs should appear pleasant and stimulate learners. This can be accomplished in a manner that reflects traditional teaching methods, not the theatrics of commercial television programs. A different set of presentational rules apply to the interactive video classroom as compared to commercial television.

- A natural, relaxed, conversational presence is best. It will make the students more comfortable and willing to participate in the class.
- Time for reading, completing problems, testing, and other normal classroom activities should be part of the interactive video classroom. Such activities can provide all participants with a needed change from lecture and discussion. "Silence is Golden" in the classroom and that applies to all classroom settings.
- All activity need not appear on the television monitor in the classroom setting. Allowing students to focus their attention away from the television monitor to individual or group projects is an effective activity. This also gives the learners a chance to unglue their eyes from the monitor, and consequently, they will be more attentive during the next block of televised instruction.

Pacing

Pacing is generally considered to be a planned and a purposeful change in the instructional activity, speech pattern, or presentation of ideas. In interactive video instruction, pacing becomes critical in maintaining the interest and attention of receiving site students. The proper use of pacing, as well as variety, can minimize the often criticized "talking head" syndrome associated with televised instruction.

- When concentrating on a lecture, the adult learners attention will begin to decrease after about 10 minutes (Ostendorf, 1989). To alleviate this problem, some change in the instructional activity should be incorporated. This can be accomplished by such activities as asking questions, having the students work in groups, or showing a video clip.

- A variety of instructional activities should be used in each class session.
- Student spontaneity needs to be encouraged. If students raise a specific issue of importance or concern, the instructor must be willing to develop it further.
- A monotone delivery must be avoided.
- A variety of visual material such as pictures, graphs, and charts can re-enforce key points. A prepared outline will help students organize the information and understand the relationships of the presented concepts.
- Movement is an important part of the presentation. A change of pace can be emphasized by moving forward to engage the audience or by taking a more relaxed, comfortable stance during a time of interaction. Movement is discussed in detail in the next section of this chapter.
- Switching from one camera to the next and zooming the camera lens in or out, add variety to the presentation. However, there is an optimum limit for switching. With some practice, an acceptable medium will be found. Students can provide feedback on this particular point.
- Prerecorded demonstrations will increase the pace and production quality. Through practice and/or video editing, prerecorded demonstrations will cover exactly what is wanted in terms of time and content. This also allows greater flexibility because what the students are viewing can be discussed as they are seeing it. Further, the speed from normal play to slow motion to a still frame can be controlled, and important sections of the demonstration can be quickly repeated.

Movement

While there are some restrictions that the interactive video classroom may impose, movement is important in maintaining the involvement and interest of the students. Feel free to stand, sit, move forward to engage students, or move back to the visual presenter to show additional information.

The close-up view that is often used for video tends to exaggerate and emphasize facial expressions and hand gestures. A simple hand gesture used to emphasize a point or to solicit a response creates substantial on-screen movement and is very effective when used in the interactive video classroom.

Although movement is encouraged, there are some limitations.

- It is important to remember that the receiving site students see the instructor only through the eye of the camera. Sudden, erratic movements may cause the instructor to "disappear from the screen". Help from a classroom technician may be necessary if there is frequent movement. Zooming the camera lens to a medium or full shot can also substitute for movement and add interest. However, a closeup or medium shot should be used most of the time.

When displaying a medium shot, the presenter's face should be one third of the distance from the top of the monitor.

- When wearing a microphone that is connected to the audio system by a cable, always be aware of the length and location of the cable. If the length is too confining either a longer cable, a wireless microphone, or low profile table top microphone should be employed.

- When moving about the classroom, be careful not to block visuals or print material from the students' view. Check the monitors frequently to ascertain that the instructional material is visible to the students.

Speaking

The key to proper oral presentation is to remain natural, relaxed, and to speak in a normal, conversational tone of voice. Speak only loudly enough to be heard clearly and distinctly by the students at the local site.

There is a tendency to rush the presentation in a televised classroom. A hurried presentation must be avoided. A normal rate of speech is all that is necessary to accomplish this. Remember that interaction is necessary.

- Try to vary vocal pitch, volume and flow of delivery. Again, as in a normal classroom lecture, such techniques can eliminate monotony and can be very useful in emphasizing important information.

Eye Contact with the Camera

The receiving site students see the instructor through the eye of the camera. When the instructor looks into the camera, eye contact is established with the receiving site students.

- The instructor's camera needs to be envisioned by the instructor as one of the students sitting in the classroom. When scanning the group during the classroom presentation, an occasional glance at the camera will acknowledge the presence of the students at the receiving sites.
- When directions or a response is given to the students at the receiving sites, look directly at the camera.
- It is not uncommon for instructors to watch the overhead monitors so intently that the students in the same room with them are forgotten.

Clothing

For the most part, instructors should dress as for a regular class. Clothing should be worn that makes them feel and look at ease. The clothing should also permit unhindered, comfortable movement of the upper body and arms.

- The microphone should not be forgotten. The lavalier microphone can be worn using either a neck cord or a small clip that is attached to the microphone. When using the neck cord, there may be some undesirable noise of the microphone brushing against clothing. The microphone can be securely attached with the microphone clip to clothing with lapels or a front opening.
- The camera may not respond well to solid, stark colors (i.e. white, yellow, red, or black).

Correct attachment of the lavalier microphone.

- Wearing clothing with small or busy patterns such as pinstripes or fine checks, especially if there is a sharp contrast in color, should be avoided. Such contrasting patterns generate a distracting shimmer or animated appearance when viewed on-camera.

Eye Glasses and Jewelry

- Shiny, reflective surfaces create annoying light patterns when viewed through a camera. For this reason, jewelry should be kept at a minimum and consist of non-reflective metals and stones.

- The surface of eye glass lens may reflect light and actually hide the eyes from view. Generally this problem can be solved by adjusting the camera iris or the lighting in the room.

Communicating with the Classroom Technician

If a classroom technician is used, he or she becomes a partner in the classroom presentation. In order to avoid confusion and interruptions, time should be taken to familiarize the technician with the planned activities before each class. Also, the technician needs to be notified well in advance if any audio-visual materials such as videotapes, slides, audio cassettes, or films are going to be used because additional set up time may be required.

A classroom technician and a presenter sharing the instructor's console. The visual presenter can be moved next to the presenter or instructor if desired.

Within a short time, a classroom technician will become familiar with the instructors teaching style and be able to respond quickly to cues and needs. However, the instructor should feel free to speak directly to the technician at any time during the class. A question, "Is my microphone working?" may be asked; or possibly a command given, "Could you zoom in on this picture?"; or the technician cued to an upcoming change, "We're going to take a break in a few minutes, but first, are there any questions?".

Occasionally, the classroom technician may need to interrupt the presentation to correct a problem. Such interruptions must be treated with humor and understanding so that everyone will remain cooperative and at ease.

Conclusion

The guidelines used in conventional classroom teaching are the same guidelines that should be applied to televised instruction. The instructor must

- Be knowledgeable and enthusiastic about the course material.
- Be concerned and interested in the student's needs and abilities.
- Present information and ideas clearly, coherently, and in a variety of formats.

Chapter 5

Overcoming The "Distance" In Distance Education And Maintaining An Appropriate Level Of Interaction

The greatest challenge in interactive video instruction is overcoming the barriers of distance and technology that hinder normal classroom interaction.

Student-teacher interaction may be negatively affected by

The novelty or fear of technology.

The number of students and/or sites included in an event.

The decreased ability to receive non-verbal cues from students.

The limited opportunity for office visits or after class discussions.

Preconceived notions about television viewing.

Through prior experiences with television, students will likely come to the classroom with a preconceived notion that television is a passive medium, one in which they are not personally active. Students certainly are not accustomed to the idea that the people on the television can see and hear everything they do, or that they will be asked to respond verbally to those people. Students are accustomed to the "couch potato" mode of viewing television.

A high level of interaction is important in teaching and learning in order to increase the attention and motivation of the learner. Interaction can also be used to determine if the information and concepts being presented are properly received and interpreted by the student.

The purpose of Chapter 5 is to review strategies and procedures that will help minimize the barriers, and ensure a valuable exchange of ideas and information. Although the points covered in this section can facilitate interaction in all instructional settings, they become critical in the distance education environment. Additional attention and effort on interactive strategies are required in order to overcome the communication barriers. General areas covered are as follows:

* **Becoming Confident with the Technology**
* **Limiting the Number of Participants/Sites**
* **Course Design**
* **Establishing Interpersonal Rapport**
* **Activities that Promote Involvement**
* **Questioning Strategies**

After reading this section, it may be helpful to take ten minutes of an existing traditionally taught class or presentation and re-design it for interactive video. As this is done, try to identify changes in the instructional strategy that will encourage interaction.

Becoming Confident with the Technology

An attitude of confidence and knowledgeable use of the new communication medium by the instructor will encourage students in return. Before the first televised class, time needs to be taken to become familiar with the technical environment of the interactive video classroom.

- Learn about the function of each camera, the monitors, and the microphones in the classroom.
- Attach the microphone and do an audio check. A classroom technician can aid in determining a comfortable volume and pitch.
- Experiment moving about the room with the microphone attached. If the microphone is not the cableless variety, practice keeping the cable out of the way and be aware of the range of movement.
- Become knowledgeable about how the in-class student microphones work. This knowledge can then be used to coach students in the correct use of the microphones during the class.
- Experiment with the various video switching modes. Practice using the system with two or more sites on-line. Note that only one receiving site can be viewed at a time.

- If they are arranged differently, visit receiving sites to become familiar with the learning environment of the distance students. The knowledge gained from such a visit can be used to coach off-campus students in case a problem arises at their site.

- Practice writing and presenting visuals using the visual presenter. Experiment with letter size and density of characters. Practice centering the material under the visual presenter by watching the television monitor.

- Expect occasional technical problems. A basic understanding of how the system works will help explain to the students what is going on and help curb frustration.

After becoming familiar and confident in the new teaching environment, concentration can be directed to instructional strategies.

Limiting the Number of Participants/Sites

The North Dakota Interactive Video Network has the capability to connect all sites simultaneously. With 20 - 30 participants per site, the total audience capacity can be several hundred participants. Increasing the number of sites and/or participants can have negative ramifications in terms of the level of interaction and the technical problems encountered.

The most distinguishing capability of the Interactive Video Network is the ability to interact verbally and visually in two directions. If the interactive capability will not be utilized for an event, another means of delivery should be considered.

When determining an appropriate number of participants/sites for an event, the event format, the instructor, and the level of interaction desired should be considered. A dynamic instructor who has extensive experience using the Interactive Video Network and who is teaching fifty participants at six sites may incorporate more interaction than an inexperienced or less dynamic instructor who is teaching fewer participants at fewer sites. A lecture with brief question or discussion periods may work well with several sites and participants; however, a presentation requiring a high level of participant interaction may not work well under similar conditions. To maintain a similar level of interaction, as the number of sites receiving an event increases, the total number of participants should decrease.

The technical aspects of the Interactive Video Network, explained in Chapter 2, should also be considered.

1. There are three video switching modes, but only the audio mode will work when more than eight sites are involved in an event.

2. When using the audio switching mode, video signals are switched by voice (or noise) activation.

3. Each classroom is equipped with one monitor that displays a single receiving site.

As the number of sites involved in an event increases, the potential for technical problems multiply. Problems can include audio echo, random video switching, and increased background noise. When a large number of sites are included in an event, these problems become more difficult to control.

Some compensation can be made for events that include several sites. For instance, if there are only a couple of participants at each site, then most of the classroom microphones could be shut off to help reduce the audio echo problem. The following equations provide further guidance:

- Several participants at a few sites = A few participants at several sites in terms of the level of interaction that can be conducted.

- Presentation format, instructor, and level of interaction = The number of sites and the number of participants at each site.

- More participants/sites = potentially more technical problems.

Course Design

Organization and preparation are key to successful teaching over an interactive video system. It is important to start early on the course planning process. The logistics of disseminating the material to the students at the receiving sites requires advanced planning, preparation, and execution. Syllabi, student packets, and textbooks must be sent before the term starts. Any last minute changes could put the students at the receiving sites at a serious disadvantage. The Site Coordinator at the local site can provide information concerning policies and procedures used to distribute materials.

Teaching over a telecommunication system requires additional planning in order

to maintain a high level of feedback and active learning. The most efficient use of the interactive class time will depend on the students, the course, and the teaching style utilized. However, due to the limited opportunity for interaction with the off-campus students, the actual class time may be more efficiently spent in discussion, assessment, feedback, and answering questions than in lecture and one-way dissemination of information. This implies that additional readings and content organization may be needed to increase the students' ability to master the objectives and knowledge presented during the course.

The majority of research concludes that more material can be covered in a shorter period of time using televised instruction versus the conventional classroom. The typical 50 minute block of instruction is covered in 30 minutes when converted to television (University of Nebraska - Lincoln, 1986). The time saved teaching via television should be used to involve the students in some type of interaction rather than presenting additional material. If this suggestion is followed, most instructors will cover approximately the same amount of material when teaching via interactive video as compared to traditional classroom teaching.

The following suggestions may be helpful while designing a course.

- Begin early. Be aware of the additional time required to prepare, organize, and send material to the receiving sites. Send enough copies of tests and handouts for each student in the class. These materials should be sent at least one week in advance of use. Instructors are encouraged to package these materials and distribute them to the receiving sites at the beginning of the course.

- Invest additional effort in organizing the material. The syllabus should clearly layout the proposed course schedule, requirements, expectations, and due dates for assignments. It should also include as much contingency information as possible, such as who to call or what to do if..... how private student/teacher conferences can be arranged, and how students can make up missed classes.

- Provide advanced organizers or outlines for each class session. This will focus students attention on the key points and increase participation and thought by freeing the student from detailed note-taking. Remember that note-taking is more difficult over television because the small area of the screen limits the amount of material that can be presented on each visual. Therefore, each visual is typically shown for a shorter amount of time.

- Save prepared or written notes from previous sessions. They can be

valuable for review and setting the stage for new material.

- Draw attention to important concepts by presenting them both orally and visually.

- Design the course to include both active as well as passive instructional methods in each class session. Use the interactive capabilities of the telecommunication system to conduct individual or group presentations as well as group discussion.

- Develop discussion questions that require analysis or synthesis. Because these types of questions often take a considerable amount of time and thought to develop, they need to be developed while planning the instruction. Refer to the section on questioning strategies for a further explanation of discussion questions.

- Negotiate special arrangements for a course with the receiving sites during the course approval process.

Establishing Interpersonal Rapport

Although the technology makes it possible to interact with the receiving site students, the barriers discussed at the beginning of this chapter make good student rapport more difficult to establish. A positive rapport will be easily established if the instructor is excited and knowledgeable about the subject, values students' comments, experiences, as well as concerns, and remains accessible. Here are a few suggestions that will help build good student rapport:

- At the beginning of the course, have the students introduce themselves using the classroom equipment. Have them state their name, major, hometown, hobby, as well as other personal data. For example, select the students' camera to begin. Have the students walk to the instructor's console, select the instructor's camera, and say their name. Then have them select the visual presenter and write their name. Next, they should switch back to the instructor's camera and tell something about themselves. Finally, have them switch back to the students' camera. The students can do the introductions individually or as a group. This exercise will accomplish the following: 1) It will decrease the "technophobia" that the students may have, so that future interaction will be less threatening; 2) If the activity is recorded on videotape, the students' names and interests can be quickly memorized by the instructor.

- Use the information obtained from the introductions to provide analogies and examples with which students can identify.

- Learn the names of students! Refer to them by name, not location. This promotes cohesiveness as well as rapport.

- Be accessible outside of class. Establish office hours when students can call the instructor. Electronic mail, secretarial support, or an answering machine may also be used. Consider providing a toll free number that students can use.

- Visit receiving sites. If possible, teach from each receiving site at least once during the course. Remember, the lack of personal "face to face" contact between teacher and learner is a major barrier to establishing interpersonal rapport and learner involvement.

- Have eye contact with the students. This is an easy task at the "originating site". Eye contact with the students at the "receiving sites" is achieved by looking at the instructor's camera, located next to the "receiving site" monitor.

- Encourage students to interact with the instructor and other students during the class period. This is discussed in greater detail in the next section.

- Show enthusiasm and research the subject matter thoroughly.

Activities that Promote Involvement

The goal of this section is to provide a few suggestions for activities that will increase the involvement of the students and may spark creativity in designing other activities as well.

- Try to adapt many of the same instructional activities used in the traditional classroom to the interactive video classroom.

- Adapt a television game show such as "Wheel of Fortune" or "Jeopardy" to the interactive video classroom. These games can be designed to be both fun and educational and the video format can actually enhance student interest in the game.

- Use local discussion groups to stimulate ideas and to formulate group responses which are presented on the television monitor.

- Have students role-play in various ways, such as debates, historical personages, and soap operas in a foreign language. Here, too, the video format can actually make this activity more successful than it would be in the traditional classroom.

- Have students read. The printed material can be displayed on the television monitor, or it can be from a printed handout or book. The reading can be done aloud or in silence by each individual student.

Students can use the visual presenter to show their work or make other short presentations.

- Assign activities that can be shared with the group using the visual presenter, discussion, or individual student presentations.

- Have students do written assignments or problems. These assignments can consist of a variety of activities including handouts to accompany many types of audio visual presentations, demonstrations, lectures, quizzes and tests, as well as written solutions to various problems.

- Have a guest lecturer speak to the class or be available for student questions. This will add credibility to the regular classroom instruction and often promotes student interaction and discussion.

Questioning Strategies

Asking questions is the most effective way to stimulate interaction. This section will address the following questioning strategies.

When to Ask Questions
How to Ask Questions
What Types of Questions to Ask

When designing or teaching a course over the interactive video system, always consider ways to increase and improve questioning strategies.

When to Ask Questions

In order for questioning strategies to be most effective, formation of an interactive environment early in the course is important. This environment must also be reestablished at the beginning of each day. If responses to questions are solicited at the beginning of each day, the students will be reminded that interactive video is NOT a passive medium. Also, students will feel more comfortable asking questions and providing feedback throughout the class period if an interactive environment has been demonstrated and established. Too often, instructors lecture and do not ask questions until the end of the class period. By then, the students are merely viewing television and taking notes. They have stopped considering questions they need to ask or answers to questions the instructor might ask them.

How to Ask Questions

The following are a few suggestions for forming questions.

- No matter what type of question is asked, the answer to the question should be within the knowledge and experience of the student.
- If technical language or a new vocabulary is used, the terminology needs to be explained.
- Most of the time, it is best to direct questions at individual students by using their given name.
- Instructors should wait for answers to their questions. Remember that silence can be an effective teaching technique in the traditional classroom as well as the interactive video classroom.

What Type of Questions to Ask

Although there is a great deal of recent research on questioning strategies, for the purposes of this handbook, four types of questions are examined.

1. **Procedural Questions**

   Procedural questions take care of housekeeping, solicit feedback on how students are responding to the instruction, and express concern for the receiving site students. Remember, the ability to receive non-verbal cues is limited. It may be too difficult to see such things as confusion

or boredom in the students' faces, or whether the students have the appropriate material in front of them. To gather this type of important information, ask procedural questions.

- Ask housekeeping questions:

  "Bob, did everyone in Minot get today's handout?"

  "Mary, I returned your assignments. Could you hand them out to the students at Fargo?"

  "Are we all looking at the graph on page 112?"

- Ask for feedback on how the instruction is proceeding.

  "How are we doing? Do I need to slow down or is this all review?"

  "Lets stop a minute. Are there any questions from Valley City?"

- Ask questions that express concern for the students.

  "Is everyone keeping up with the readings?"

  "Do we need to spend additional time reviewing the topics discussed last class session?"

2. **Discussion Questions**

   A useful way to increase active learning is to include group discussions in the instructional design. Take time to design questions that will help focus the discussion. Monitor the discussion in order to keep the interaction focused on the discussion topic, and reserve time for each group to present their conclusions.

   The type of discussion questions will depend on the subject matter and the students. However, it is generally valuable to encourage discussions that require analysis (breaking down an idea or concept into its essential components), or synthesis (combining ideas or concepts into a unique communication). Action terms normally found in analysis type questions include 'identify', 'discover', 'resolve', or 'detect'. Action terms found in synthesis type questions include 'compose', 'develop', 'design', or 'invent'.

3. **Evaluative Questions**

The purpose of evaluative questions is to discover if the course material is being understood by the students, as well as to assess how well the instructor is performing. Evaluation can be both formal or informal. Formal evaluations include written assignments, tests, and student evaluation forms. Informal evaluations include asking spontaneous questions to determine if students understand the discussion and to request feedback from the technician and facilitators as to how the course is proceeding.

Due to the importance of interaction in telecommunication teaching, it may be beneficial to increase both formal and informal evaluation opportunities. Request student feedback about a third of the way into each class. Adjustments or changes to the presentation style or course material can then be made before the course ends. Also, asking additional questions that test student knowledge and requesting more frequent, short writing assignments will allow a more continuous assessment of student progress.

4. **Review Questions**

Questions that allow students to review, summarize, and organize earlier material will be very useful in preparing the student to move into new material. In order to increase interaction, it may be beneficial to ask specific students to review the previous class session or to summarize a reading. Such requests may be spontaneous or assigned in advance. The positive effects will be increased participation and employment of a more active learning method.

Chapter 6

Preparing And Presenting Visual Aids

Much of what students learn today is acquired through their sense of sight. Putting aside individual learning styles and preferences, the eye is capable of gathering more information in a shorter amount of time than the ear. Furthermore, students will retain the information longer if it is presented in a visual format.

Television is a visual medium. When the interactive video system is used to teach the role of visual aids naturally increases. In order to explore the area of visual aids for television, this chapter is divided into the following sections:

* **Formats for Visual Aids**
* **Design and Layout Criteria for Visual Aids**
* **Presenting Visual Aids**

Formats for Visual Aids

In the Interactive Video Classroom, all visual material needs to be in a video format before it can be displayed on the television monitor. Visual aids that are used in a traditional classroom may or may not be useable in the Interactive Video Classroom. Some of these aids will be useable, but they may need to be reformatted. On the other hand, some new types of visuals which were previously difficult or impossible to display using traditional classroom equipment may be included.

This section will explain the capabilities and list the types of visual material that can be displayed using selected pieces of equipment.

- **The Visual Presenter.** This device functions much like an overhead projector. The visual presenter has more capabilities than an overhead projector and the graphics are easier to prepare than transparencies. This device can display photographs, charts, maps, information from books, and small three dimensional objects. All items are displayed in color and they can be magnified using the zoom lens of the built-in camera. Visual aids to be displayed using the visual presenter should be no larger than 9 inches high x 12 inches wide. Larger objects can be displayed by placing them on the instructor's console and using the instructor's camera.

The visual presenter can display three dimensional objects.

- **VCR (Video Cassette Recorder).** Each classroom is supplied with a 1/2 inch VHS player/recorder. This recorder is capable of displaying a quality still frame for short periods of time. Be aware that there are several formats for video tapes including 3/4 inch U-Matic and 1/2 inch Beta. The 1/2 VHS recorder supplied in the main classroom will not play other videotape formats. To play these other formats of video tape, either have the information transferred to the 1/2 VHS format or make arrangements to have the appropriate VCR connected to the classroom system. There is extra space available in the instructor's console to accommodate such added equipment.

- **Slide Transfer System.** This device can be used to display photographic slides. It looks and operates similarly to a traditional slide projector. Some slides will not work well when displayed for television, especially slides that are taller than they are wide. Design and layout criteria for slides and other visuals are discussed in the next section.

The instructor's console was designed to accommodate additional equipment quickly and easily. The following pieces of equipment are optional and are not included as standard classroom equipment. The use of additional equipment such as the following items, is encouraged whenever they are available and they can enhance the presentation.

- **Film Transfer System.** This device converts film images to the video format. There are many variations of this device, but the simplest type looks and operates exactly like a regular projector. The only difference is that the projection lens has been replaced by a miniature video camera. Some large film libraries such as the North Dakota State Film Library, may be able to convert certain films to videotape at a minimal cost.

  A film image can be projected to a wall screen or to a rear screen projection unit, and then a video camera can be used to record the image. However, this process does have a disadvantage. Due to the persistence of vision, the human eye does not normally see the shutter; the camera will see it, and the result will be a slight black flicker as the videotape is played. This may be unacceptable; in which case, one of the other transfer techniques described must be used.

- **Microscope Camera**. With this device, anything that can be viewed with a microscope including microscopic organisms and miniature electronic circuits can be projected to a television monitor. Once the "miniature camera" is attached to a standard microscope, the microscope is used in the normal fashion.

- **Videodisc Player.** This device can display everything that a VCR can with additional capabilities. With a videodisc, any point on the disc can be accessed almost instantly without wasting time trying to rewind or fast forward. Points on the disc can be accessed using a bar code reading wand and corresponding labels within lecture notes, or they can be programmed into the videodisc player. The video disc player can also be connected to a computer and the computer can perform the search. Thousands of single frames of still images or slides can be stored on one videodisc. The still images can be displayed for unlimited lengths of time and the picture quality of the images is excellent.

- **Computer.** Recent developments in hardware and software make the computer an exceptionally good tool for generating high quality text and graphics for the video format.

To make a computer useful in the interactive video classroom, the following items need to be included in the computer system.

1. **Presentation Software.** This software is designed specifically for making presentations and should include such features as automatic templates for the background, automatic generation of charts and graphs (just input the data), a simple method of generating text, and the ability to generate several colors.

2. **Color.** The computer should be able to output color images. Some computers may not have a color screen, but they may be able to assign colors to text or other graphic elements and then output color images to the television monitor in the interactive video classroom. A color screen is preferable so that the chosen color combinations can be viewed before they are presented in the classroom.

3. **Video Signal Output**. Most computers cannot output a NTSC video signal unless a special internal video output card or "external box" is added to the computer. If this card contains Genlock, computer generated text or images can be superimposed on top of another video signal.

The computer is also capable of generating high quality digitized sound. It can also connect to many other peripheral devices such as a CD-ROM player or modem. These devises can provide immense on-line resources in the classroom.

- **Character generator**. This device is a specialized piece of equipment that takes on many different forms, it often looks like a small key pad. This device will electronically produce letters and numbers directly on the television monitor. If this device contains Genlock, the characters can be superimposed on top of a video image.

- **Chalkboard or Marlite Board**. These devices are used as they would be in the traditional classroom. However, the design and layout criteria for visual aids that are discussed in the next section must be followed. Not all interactive video classrooms have these boards available because the visual presenter is usually used in their place.

Design and Layout Criteria for Visual Aids

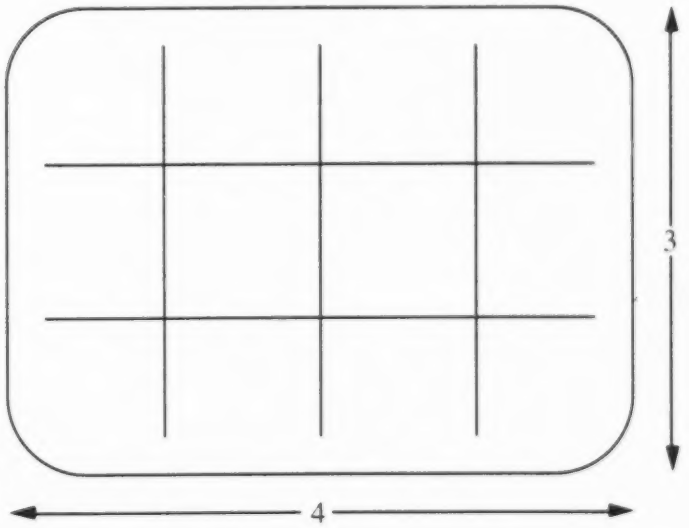
In order to properly select or prepare visual material for a class, it is important to understand the design and layout requirements of video images. Until instructors are familiar with what works and what does not work well on television, they should take time to test the legibility of their visuals before class using the actual classroom equipment if possible. The selected or prepared visual aids must conform to the design and layout criteria within these five areas.

* **Aspect Ratio**
* **Safe Area**
* **Size and Quantity of Letters**
* **Resolution**
* **Contrast and Color**

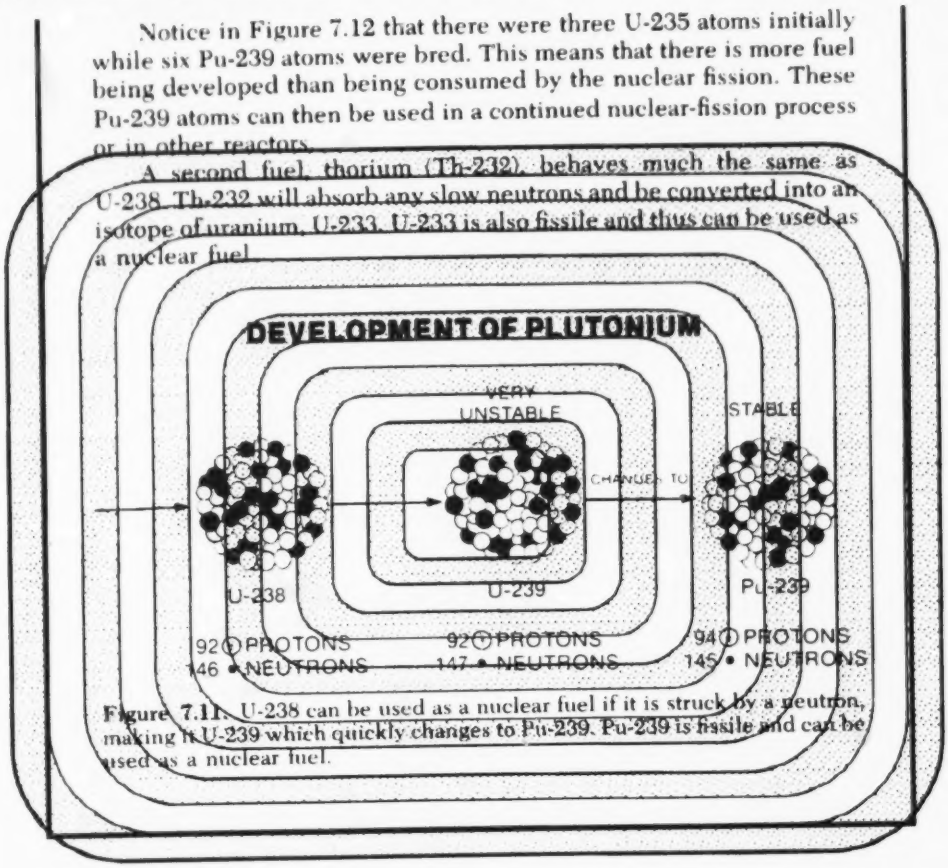
Aspect Ratio

The aspect ratio of the television monitor is three to four; the picture is always three units high to four units wide. All visual information must be contained within this 3 x 4 aspect ratio. Graphic materials, such as slides, photographs, and flat materials, should be presented in this horizontal area.

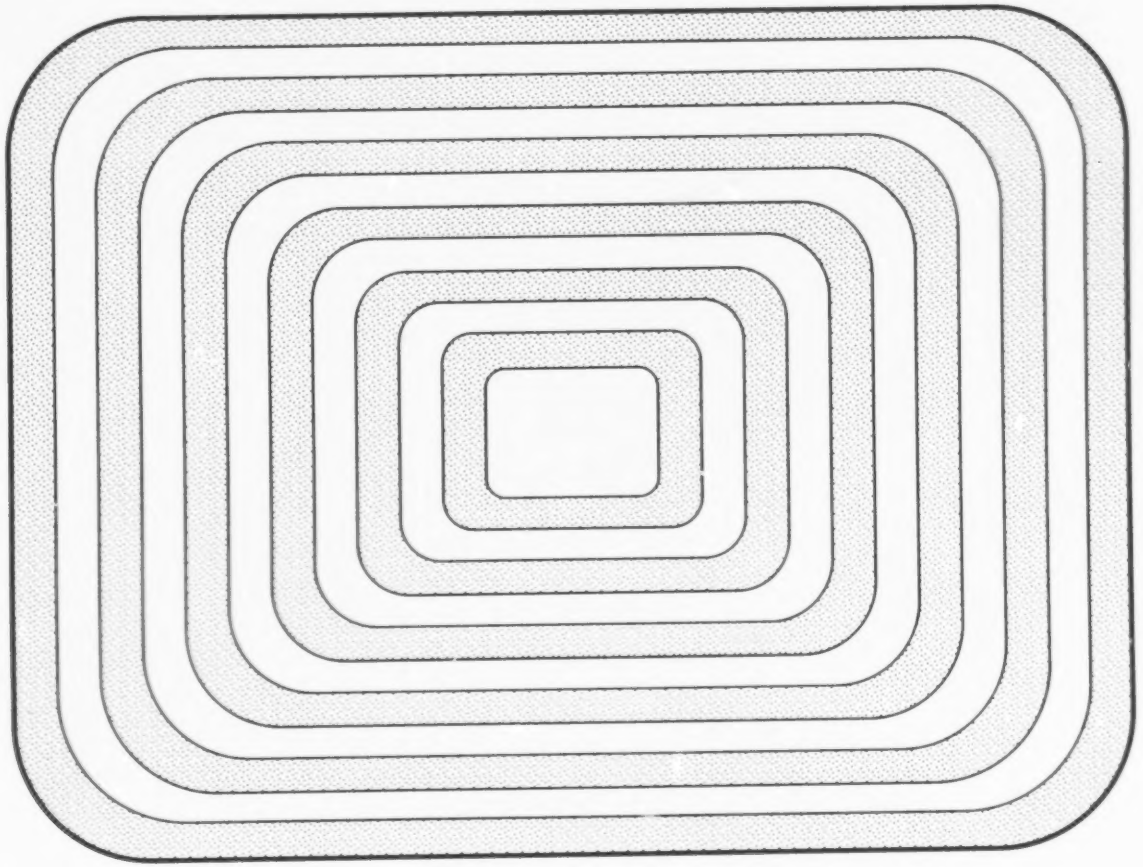
Aspect Ratio



To quickly determine what portion of an existing photograph, illustration, or other graphic will appear on a television monitor, a video aspect ratio transparency can be used. To make a transparency, the graphic provided on the next page should be enlarged with a photo copier to about 150% of the original size. Then a transparency is made from the photocopy. The transparency is comprised of several rectangular boxes, each one conforming to the video aspect ratio. To use the transparency, the transparency is simply laid on top of a graphic and adjusted to determine if the desired elements of the graphic fit into <u>one</u> of the boxes.


Notice in Figure 7.12 that there were three U-235 atoms initially while six Pu-239 atoms were bred. This means that there is more fuel being developed than being consumed by the nuclear fission. These Pu-239 atoms can then be used in a continued nuclear-fission process or in other reactors.
A second fuel, thorium (Th-232), behaves much the same as U-238. Th-232 will absorb any slow neutrons and be converted into an isotope of uranium, U-233. U-233 is also fissile and thus can be used as a nuclear fuel.
DEVELOPMENT OF PLUTONIUM
VERY UNSTABLE
STABLE
CHANGES TO
U-238
U-239
Pu-239
92 PROTONS
146 NEUTRONS
92 PROTONS
147 NEUTRONS
94 PROTONS
145 NEUTRONS
Figure 7.11. U-238 can be used as a nuclear fuel if it is struck by a neutron, making it U-239 which quickly changes to Pu-239. Pu-239 is fissile and can be used as a nuclear fuel.

A video aspect ratio transparency placed on top of a page from a book. (Page courtesy of <u>Energy Technology: Sources of Power</u>, Schwaller, 1980.) To include all of the graphic in the safe area of the monitor, elements within the largest clear rectangle should be displayed. This would include the illustration description and the last three lines of the main text.

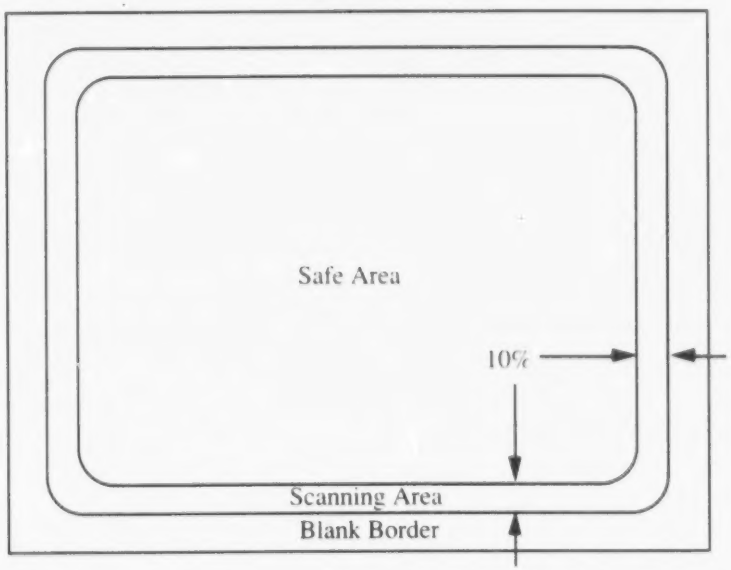


Video Aspect Ratio

Safe Area

The area framed by the camera and displayed on the television monitor is called the scanning area. The safe area is a smaller area contained within the scanning area. (Reference the illustration below.) All pertinent information should be contained within the boundaries of the safe area if it is to be seen on the television monitor. Information outside the safe area can be lost or distorted. The actual size of the safe area, as compared to the scanning area, will depend on the television monitor that is used. As a general guide in determining the safe area, at least a 10% border should be allowed around the inside edge of the scanning area. A more accurate test would be to display the visual aids using the actual classroom equipment and then view the visuals from the back of the student seating area.

Safe Area



In addition to a 10% border around the safe area, a blank border should be included outside of the scanning area. This blank border allows visuals to be framed quicker because their exact placement under the visual presenter is not necessary.

- The total blank area that should surround the graphic elements on an 8 1/2 x 11 inch sheet of paper is 1 - 1 1/2 inches.

Size and Quantity of Letters

Lettering is the most critical element in many of the visual aids prepared for classroom instruction. Lettering can be used on prepared visuals such as slides, layouts made for use with the visual presenter, and computer generated graphics. Lettering can also be generated in the classroom using less formal methods, such as writing on a blackboard, marlite board, or writing under the visual presenter.

The following guidelines can be used to determine the size and quantity of letters to use regardless of how they are generated. This is true because no matter how big or small the original letters, they are all projected to a television monitor that does not change in size. Of course, lettering for a blackboard needs to be larger than lettering for the visual presenter, and the size of lettering presented with the visual presenter will vary. The appropriate letter size is directly related to the amount the visual is magnified or reduced by the zoom lens of the camera.

- 8 lines of type maximum.
- 50 words maximum.
- The space between lines of type used for television should be one and a half to two times greater than what is recommended for printed materials.
- Use markers, chalk, and printers that yield bold lettering.
- Use printed type styles that are plain and easy to read. Fancy fonts are difficult to read on a television monitor.

Because much of the text material will probably be displayed using the visual presenter, some additional guidelines and hints are listed below:

- A single visual contained on an 8 1/2 x 11 inch sheet of paper should have lettering that is at least 1/4 inch (18 points) high and preferably 3/8 inch (27 points) high or more.
- Most textbook lettering is unusable unless the text is of the above mentioned size, or the pages are divided into three or more columns of text and the text can be enlarged to the above mentioned size.
- The best way to produce large text is to use a computer and a good quality printer such as a laser printer. Satisfactory results can be obtained from a typewriter.

Using a Typewriter to Create Text for the Visual Presenter

The text in the box to the right was created using a typewriter. Each of the three paragraphs represent a single visual to be displayed using the visual presenter.

Six of these paragraphs can be placed on a single 8 1/2 x 11 inch sheet of paper. The paragraphs can be displayed at this small size by magnifying them with the zoom lens of the visual presenter. Another option is to enlarge the paragraphs with a photocopy machine so that each paragraph fits on its own 8 1/2 x 11 inch sheet of paper. As an example, the first paragraph was enlarged 200% with a photo copy machine. The enlarged graphic appears on the next page.

The exact width of typed text columns and the number of lines of type that can be included on a single graphic will depend on the size and style of type the typewriter produces. The design and layout criteria previously explained should be used to determine the appropriate column width and number of lines.

Lettering that is to be displayed using the visual presenter can be created using a type-writer and a photocopy machine.

Place the text in columns that are about 2 inches wide. Use a line spacing of 1 1/2. After about 6 lines of type start a new paragraph.

The final step is to enlarge each paragraph approximately 200% with a photocopy machine. Remember to use colored paper.

Lettering that is to be displayed using the visual presenter can be created using a type-writer and a photocopy machine.

Resolution

Just as text needs to be of a simple style and broad stroke, charts and illustrations need to be uncluttered and use broad lines. Thin lines and small details will not produce acceptable results when viewed on a television monitor. Existing graphic material can often be made acceptable by enlarging it with a photo copier and retracing the important lines with a broad marker.

Contrast and Color

The color aspect of video adds realism and interest. Color can be used to focus the viewers attention on an important word, phrase, or a particular area of an illustration.

Video does have some problems handling colors that are highly contrasted (i.e. black lettering on a white background). Very bright colors (i.e. white or florescent green) can cause picture flare and distort other colors within the picture. The best colors to use for video are those in the middle of the color spectrum. For visual aids, a light gray, blue, or pastel background will work best if black lettering is used. If colored lettering is used, yellow letters work well with a variety of background colors, especially light gray or blue. Many combinations of colors will produce pleasing results. Combining highly contrasted colors must be avoided.

Presenting Visual Aids

When teaching in an interactive video classroom, always be aware of what the receiving site students are seeing on their television monitor. This means that instructors need to keep one eye on the overhead monitor at all times, including when they are presenting visual aids.

There are also other reasons why instructors should watch the overhead monitor. When presenting visual aids, it is appropriate to switch to the instructor's camera occasionally to maintain "face to face" contact with the students at the receiving sites. Because the instructor's camera is next to the overhead monitors, it is easy to maintain eye contact when switching from one camera to the next. When watching the overhead monitors or the instructor's camera, it is also easy to glance at the receiving site monitor to view the students at the receiving sites.

When using the visual presenter, watch the overhead monitor and not the visual itself. This will assure the following:

- The visual is properly centered.
- Written material runs horizontally across the monitor. It is legible, and it does not run off the edge of the scanning area. Watching the overhead monitors while writing beneath the visual presenter can be awkward at first, but it is important to master this technique. Lightly ruled paper may be helpful to some instructors.

An instructor watching the overhead monitor while writing beneath the visual presenter.

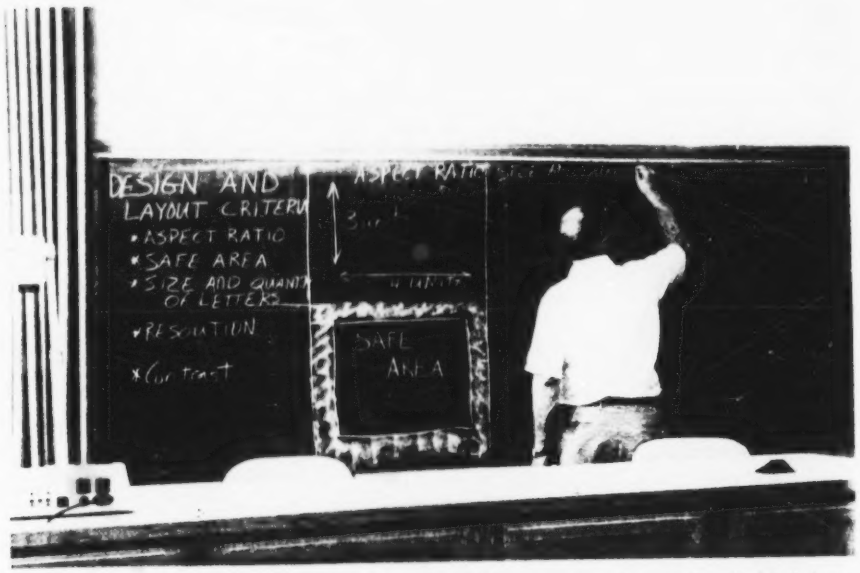
- The visual is not being blocked by a hand, arm, or head.
- The lens is set at the proper zoom level. If the zoom is too far out, part of the flatbed may be captured by the camera, detail may be sacrificed, and the text may be too small to read. If the zoom is too far in, the students may not see all of the visual, and the text may run beyond the scanning area of the monitor.

Some instructors may choose to use a marlite (dry marker) board or a blackboard on which to write their lecture notes. Be aware of the following disadvantages of using a large wall mounted board.

- The instructor's camera will be used to display the material, so the students will be viewing the instructor's back as they write.
- Due to the resolution of the television monitor, it is necessary to make an extra effort to use very thick lines.

- It is awkward and difficult to write on a large wall mounted board and watch the overhead monitor at the same time. It will take additional practice to be assured that the print is legible on the television monitor, and that it stays within the safe area of the television monitor. A classroom technician may be needed to operate the instructor's camera so that text will be properly framed.

- The design and layout guidelines discussed in the previous section must still be followed. This means that most instructors will not be able to display as many words on the board at one time as they would in the traditional classroom.



A marlite board or blackboard used in the IVN classroom is usually divided into retangular sections adhereing to the 3 x 4 aspect ratio. These sections are captured with the instructor's camera and displayed one at a time. The information contained in each section must adhere to all design and layout guidelines discussed in this chapter.

An alternative to the large board is a small marlite board that can fit under the visual presenter. This type of board does not allow physical self expression in the way a large board would, but it has the advantage of using the visual presenter.

Most of the other visual aids used in the interactive video classroom require no special presentation techniques beyond the traditional classroom techniques. As in the traditional classroom, cue up all visual aids before the class begins.

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Glossary

Amplifier: An electronic device for boosting or strengthening a video or audio signal.

Aspect Ratio: The proportions of the television screen, and therefore, of all video pictures, three units high and four units wide.

Audio: Pertaining to sound, specifically here to the sound accompanying the visual, or video, portion of television.

Beta (Betamax): The 1/2" inch videocassette system developed by Sony for consumer and industrial use.

Camera: In television, an electronic device utilizing an optical system and a light-sensitive pick-up to convert visual images into electrical impulses.

Character Generator: A special-effects generator that electronically produces letters and numbers directly on the television screen, or keyed into a background picture.

Close Up (CU): A picture that consists of a single object such as a person's head or a telephone.

CODEC: Short for code and decode. A device used to compress a video signal so that the resulting signal can fit onto a smaller carrier. The device can also reconstruct a compressed signal, so that it can be displayed on a television monitor. These devices can also change an analog signal to a digital signal and vice versa.

Color Bars: A standard test signal that appears as a series of vertical color bars by which technical personnel can check a video signal.

Couch Potato: A human vegetable whose life support system consists of the sight and sound of television. This person rarely shows any sign of high level brain activity and is usually confined to an easy chair or couch.

Distance Learning: Any recognized learning that takes place while the learner is physically distant from the instructor and from the site of the materials.

Dub: To copy the material recorded on a video or audiotape onto another video or audiotape.

Editing: To copy or record parts of a videotape, perhaps changing the sequence of events or deleting unwanted parts.

Encryption: A means of safeguarding the transmitted classroom signal from unauthorized reception and decoding. It is a key or code that is input into the CODEC at both the originating and receiving sites.

Event: A class, seminar, meeting, or other activity that utilizes the Interactive Video Network.

Event Coordinator: Any person wishing to conduct a class, seminar, or other activity over the Interactive Video Network.

Fax Machine: Photocopy device that transmits the copy to a distant site via telephone lines.

Feedback: (a) Video: wild streaks and flashes on the monitor screen caused by re-entry of a video signal into the switcher, and subsequent overamplification. (b) Audio: piercing squeal from the loudspeaker caused by the accidental re-entry of the loudspeaker sound into the microphone and subsequent overamplification of sound.

Format: Videotape recorder formats are designated by the width of tape they use and the method of recording; i.e., 2-inch Quad, 3/4-inch U-Matic, 1/2-inch VHS.

Genlock: An electronic circuit that "looks" at an another video signal and then manufactures its own video signal in step with it. This allows two separate video signals to be superimposed or combined together.

Lavaliere: A small microphone that can be clipped onto the lapels of a jacket, a tie, a blouse, or other piece of clothing. Some varieties are suspended from neckcords and worn in front of the chest. Also called neck or chest microphone.

Light Emitting Diode (LED): A small light used to show the status of an electronic circuit or control.

Live: A program that is transmitted as it happens, with no significant delay.

Long Shot (LS): A shot which covers the whole scene of action.

Master: The originally recorded video or audiotape.

Medium Shot (MS): Between a LS and a CU, usually a shot of a person from the waist up.

Monitor: A television that accepts direct cable feeds from a video camera or other NTSC composite video source.

Noise: (a) Audio: unwanted sounds (static) that interfere with the intended sounds, or unwanted sound signals. (b) Video: electronic interference that shows up as "snow" or rectangular blocks of various translucent colors.

NTSC: The video standard used by the United States and Japan. There are two other standards used world wide, PAL and SECAM. None of these three systems are directly compatible.

Originating Site: The site which initiates the video activity. The Event Coordinator works through the Site Coordinator at the originating site.

Pan Right (Left): Rotating the camera on its horizontal axis.

Receiving Site: All sites, other than the originating site, participating in a video activity.

Release: A signed agreement giving the right to reproduce the likeness of a person, place, or thing in a program.

Scheduling Coordinator: Person responsible for day-to-day scheduling of interactive video events.

Site Coordinator: Person designated by the campus for coordinating on-campus details in classroom scheduling and for being the sole approval authority for all video system activities on his/her campus.

Talking Head: A continuous close up camera view of a human head that projects a barrage of information using the lecture format.

Technophobia: A fear of technology, usually due to a lack of understanding and/or confidence in the use of technology.

Teleconferencing: Interactive group communication through an electronic medium. Can be audio only or a combination of audio and video images.

Test Tone: An audible tone generated by a technician to establish a reference for recording during equipment setup.

Three-Quarter Inch U-Matic: The 3/4 inch videocassette format developed for broadcast and industrial use. The width of the videotape is 3/4".

Tilt Up (Down): Rotating the camera on its vertical axis by pointing the camera up or down.

VCR: A general term used to describe a video cassette recorder of no specific format.

VHS Videocassette: (Video Home System) The 1/2" inch videocassette format developed for consumer and industrial use. The width of the videotape is 1/2".

Video: (a) Picture portion of a telecast. (b) Includes the picture and sound portions of a telecast when used as "interactive video".

Videodisc: A phonograph record-like disc that can store video, audio, and data information. Useful for instant playbacks, slow motion, and freeze frames.

Videotape: A plastic, iron oxide-coated tape of various widths (from 1/3" to 2") for recording and playback of video and audio signals and additional technical code information.

Visual Presenter: A piece of classroom equipment that looks similar to an overhead projector. The device contains a color video camera that can display lecture notes, illustrations, and small three dimensional objects. Sometimes referred to as an overhead or pad camera.

Voice-Activated Microphone: A type of a microphone which is activated or opened by the sound of a voice.

Zoom In (Out): A change in the focal length of the lens which appears to move the subject closer to or further away from the camera.

Zoom Lens: Variable-focal length lens that can change from a wide shot to a closeup, or the reverse, in one continuous move.